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### » TOC

Some go to great lengths to build the muscle car of their dreams. **Chad Longo** went the distance with his 740hp '67 Chevelle. There's more starting on page 42.  
Photo by **Tim Sutton**





# ENTS

## » ON THE COVER

Everybody loves a gasser-style hot rod, but few have the stones to actually build one. **Ron Blanchard** does, and he put together one of the coolest nose-high '55 Chevys on the West Coast. See it on page 16.

Photo by **Tim Sutton**

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# FIRING UP

Nick Licata NLicata@enthusiastnetwork.com



## Two of GM's Major Icons Got Left Behind in the Late-Model Muscle Car Wars

**With the resurrected** Camaro hitting the streets back in late 2009, Chevy performance enthusiasts have had plenty to cheer about in the world of late-model muscle. It was a long time coming, and the fifth-gen arrived with plenty of power, handled well, and like the first-gen, it carried a good amount of attitude. With the addition of upgraded models like the 1LE, ZL1, and the amazing Z/28, the car continued to gain major street cred for the power-hungry folks itching for even more performance. Needless to say, all is good in "Chevyland"... or is it?

and designers would be able to capture some of that 1970 Chevelle spirit and turn out a killer-looking, modern version packed with a pissed-off LT1. Think about it – we'd have two more models with the ability to wake up the neighborhood and keep Ford and Dodge on their toes and in our rear-view mirrors.

Is this some sort of crazy pipe dream of



Photo Courtesy of GM

It seems Chevy's two other prominent performers from the muscle car golden era got the short end of the proverbial stick shift; namely, the Chevelle and the Nova. Sure, you could argue that those models were not quite as popular as the Camaro, but these two muscle car icons have been completely ignored in the late-model-performance-car-resurrection wars. Call me crazy, but I'm betting a late-model Chevelle, if done properly would have easily outsold the new Chevy SS. Now, I've driven the SS and it's a great car, but I think simply calling the car an "SS" was a little confusing since, historically speaking, "SS" (Super Sport) has always been known as a performance upgrade to an already-existing Chevy model.

So, should the GM brass look into giving the Nova and Chevelle a shot at this late-model performance car game? Why not? In the early '60s, these cars paved the way for the Camaro's very existence. That alone should be worth giving them their day in the sun once more.

With that said, it's got to be done right. I'm not talking about the embarrassing 1985 version of the Nova (that's not even funny), I'm talking about the Chevy design team dusting off the old toolbox and incorporating the soul of the 1967 or '68 Nova and putting it into a badass late-model performer with some sweet styling and aggressive body lines. Same goes for the Chevelle. No, not today's Malibu, either. I know GM's talented artists

mine? Probably, but with the popularity of the fifth- and soon-to-be successful sixth-gen Camaro, I can't help but think there has to be something to chew on for a revised version of the Chevelle at the very least.

So, while you fine folks at GM take my ideas into consideration, you don't even have to give me credit. In exchange, just send over one of those "old" 2015 Z/28s for a while. Besides, you could probably use the extra room for all those new 2016 Camaros heading your way.

You in?



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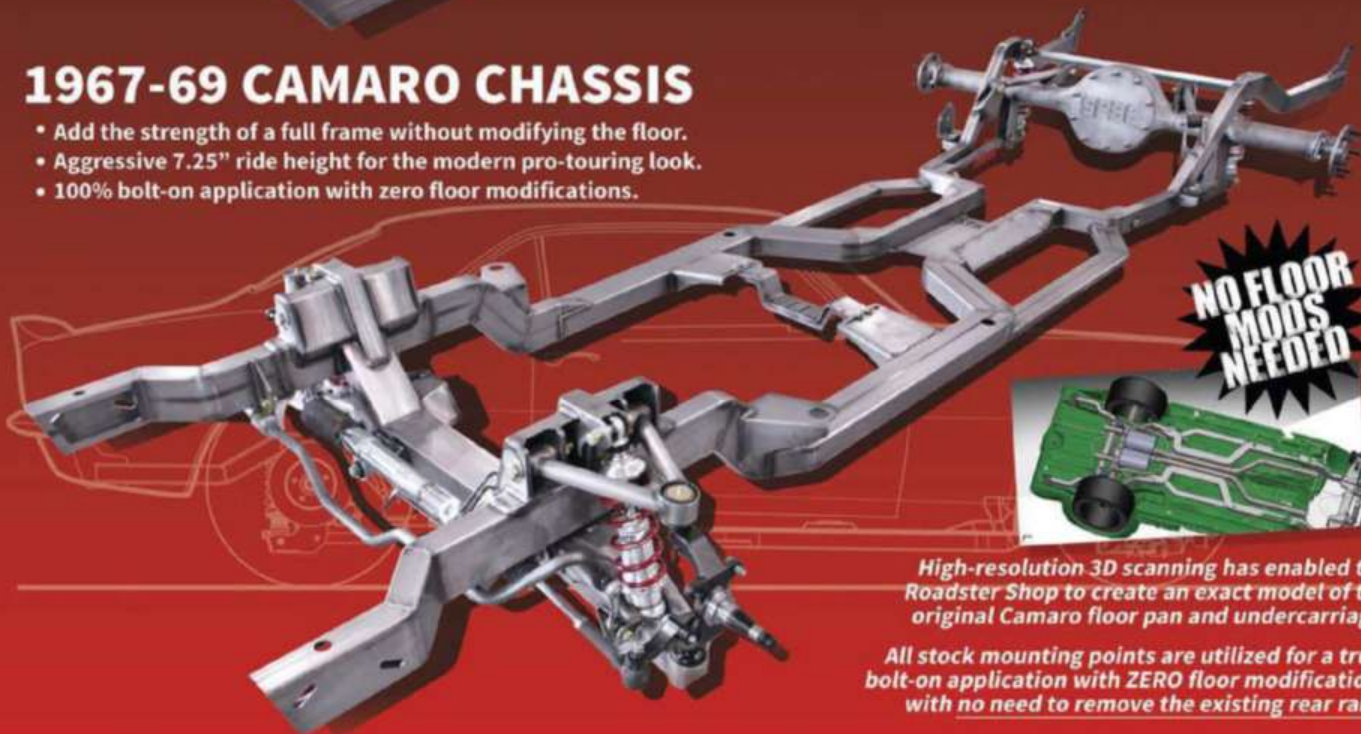
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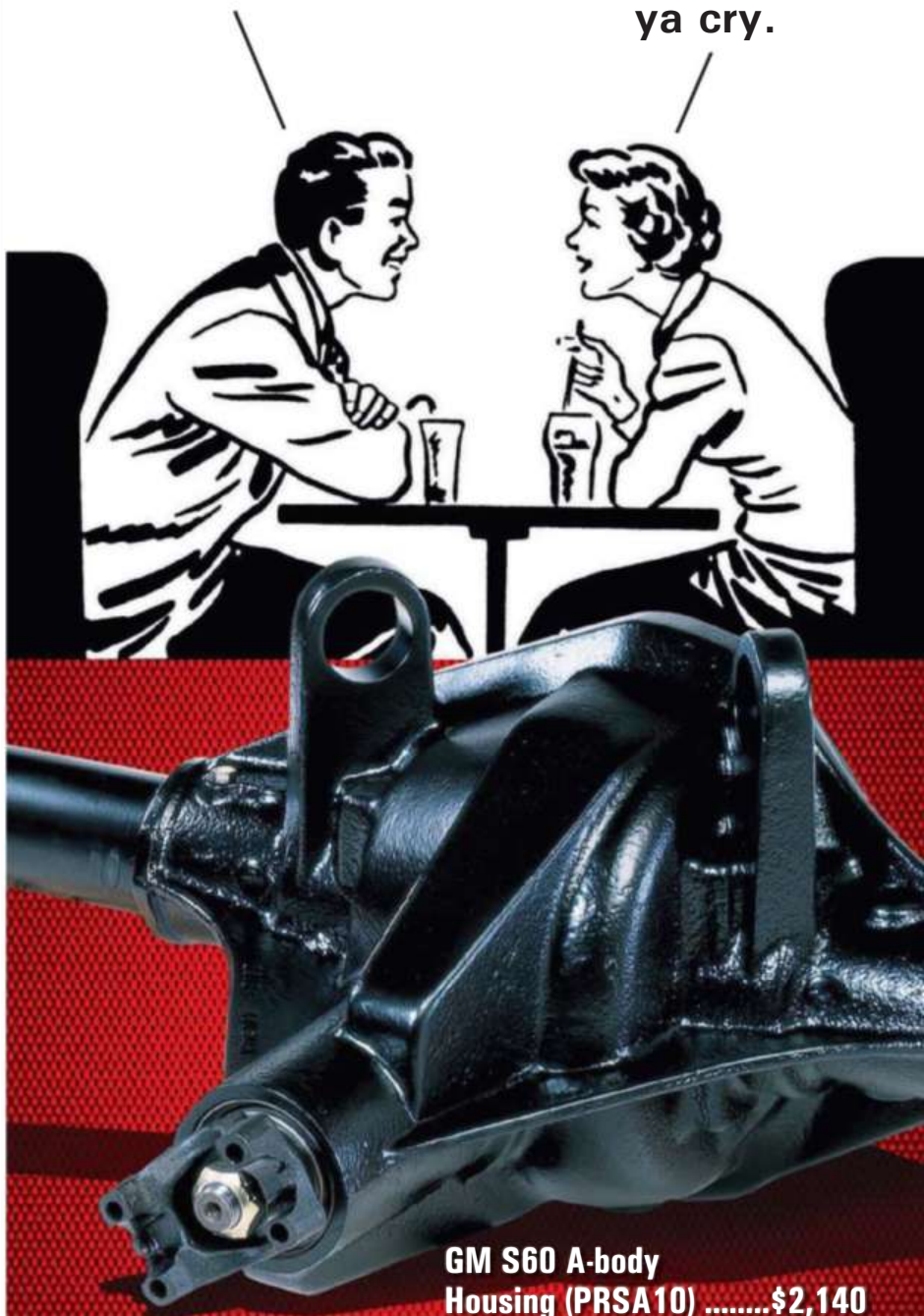
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# STRAIGHT LINE▶ SPOTLIGHT

❖ TEXT & PHOTOS: **Bruce Biegler**

## Atlanta Award Winner

❖ The “beat” in popularity and innovation for the fifth-gen COPO Camaro in drag racing continues. During the Summit Racing Equipment NHRA Southern Nationals last spring, some special recognition was given to the 2012 machine raced by Louisiana’s Stephen Bell. Bell’s car was selected for that event’s coveted Aerospace Components NHRA Excellence in Engineering Award over a massive field of contenders. This car features an apparent first for the COPO breed – it is a five-speed car that has been back-halved (by Vic Custer at East Texas Race Cars). Depending on his intended class destination, Bell chooses between either a 327ci (500hp) or a Roush-supplied 350ci (548hp) engine combination. While the car’s primary destination is NHRA’s now-thriving FSS (Factory Stock Showdown) class, he can also race the machine legally as a Super



Stocker. The beautiful red car is as fast as it looks, too – capable of low 8-second e.t.’s. At the track and at the shop, Bell receives great support from dedicated right-hand man and crew chief Mike Stanfield.



## A Jewell of a Corvette

❖ The husband and wife team of Jerry and Shirley Jewell have certainly stood the test of time racing their always-impressive 1967 Corvette. Incredibly, the Ulysses, Pennsylvania-based machine has been in the Super Stock class mix for many seasons, and its winning record in both NHRA and IHRA is rather remarkable. Since his initial win at the 2002 IHRA nationals held at Empire Dragway in western New York, Jerry’s collection

of trophies has increased exponentially. That now includes some seven NHRA national open titles, 17 NHRA Division One class wins, as well as some national record-setting performances. The car is usually run in SS/DA class trim and presently races with a 427ci engine, which is refactored to 419 hp. Jerry and Shirley fund their meticulous Corvette’s racing program independently from their self-run Jewell Computing Services company.



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## Can-Am Camaro Collaboration

✚ The beautiful Pacific Northwest has produced a very interesting new Pro Mod racing alliance this season featuring Washington state's Shane Molinari and British Columbia's Ryan Hinrichsen. That duo, in conjunction with crew members Tyson Carr (crew chief), Justin Bond, Cole Welch, Mike Micelli, and Tom Gaynor, have focused their attention within NHRA's 10-race RPM (Real Pro Mod) scene with a slick twin-turbo 1970 Camaro. Powered by a Generation III Pro-Line Racing built 481X engine, the car and the team have shown steady progress and improvement in their first season on the tour. This car features a



chassis built at Hinrichsen's RH Race Cars (Kelowna, British Columbia), but Ryan admits that it is a bit of a rolling testbed while he hones his skills for an even more concentrated and higher-tech approach for his company going forward. Shane has dipped the car well into the 5-second zone with terminal speeds topping 250 mph – both indicators of a bright future to come for the aspiring new team.

## Lingenfelter Legacy Car

✚ Indiana's Jeff Myers helped to carry forward the iconic name of drag racing great John Lingenfelter (who passed away on Christmas Day, 2003) during 2015. Myers, who works at the company John founded (Lingenfelter Performance Engineering), races a 2013 COPO Camaro, which is painted to resemble the classic Meyer & Lingenfelter 1969 Camaro Super Stocker campaigned so successfully in the 1970s. Jeff can run his car in Stock and Super Stock configurations using

either a 427ci LS7 (430hp with LS7 heads) or 427ci (450hp with LSX DR heads) engine programs – both built in house at the Lingenfelter facility. Myers' car was first obtained from Chevrolet through the Jim Crivelli Chevrolet dealership (McKees Rocks, Pennsylvania). He reported that shortly after that there was a family decision to use it to commemorate and honor John Lingenfelter for all the contributions he made to both the performance industry and within NHRA drag racing. We say Bravo for that!







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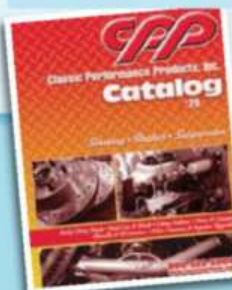
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# FILTHY FIVE

Ron Blanchard's Evil, Mean, and Nasty '55 Chevy

❖ TEXT: **Chuck Vranas** | PHOTOS: **Tim Sutton**

➔ **Ever walk through** a car show or a cruise night and come across a car that has such a deep crowd around it that you have to sift your way through just to catch a glimpse? It's the one that has everybody talking; one with such a wicked stance and massive attitude it looks like something the devil himself would drive. We recently came across one such car at the 2015 Grand National Roadster Show in Pomona, California, where its presence quickened the pulse of anyone within its sight line.











Flash back to Southern California car culture during the early '60s where the sounds of hopped-up V-8's snarling through long-tube headers lit up the streets. If you were pulled in by the hypnotic sounds there was most likely a dragstrip nearby where you could see plenty of your hot rod heroes challenge the Christmas Tree, and each other, on a weekly basis. If this sounds like it was adrenaline rush, you're right, it was; and the spirit of the era carries on with the car you see here ... more on that in a moment.

Ron Blanchard of Ontario, California, was one of those chosen few who got indoctrinated into the hobby at a young age. While growing up, a good portion of his time was spent working at his uncle's small-engine repair shop, which was usually packed with customs being built during the off-hours. This is where he initially learned to spin a wrench under his uncle's guidance, which then led him down a path to mastering his high school auto shop classes. Being able to check out late-night racing on the streets of the Inland Empire as well as at the dragstrip supercharged his passion, which led to him owning a group of hop-ups over the decades, including a twin-turbo 1967 Camaro RS. He never forgot the wild days of watching cars launch from the lights at the busy Southern California dragstrips, and

it was an elusive 1955 Chevy gasser that still haunted him, leading to countless sleepless nights.

As the owner of Performance Carb & Speed in Ontario for over 20 years, he put the word out amongst his contacts that he was





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looking for a '55 to build. The search started with one of his good friends giving him a set of fenderwell headers to act as motivation to kick the search into high gear. Eventually, one of his customers contacted him with the offer of an original '55 Chevy 210. It was a center-steer, altered wheelbase car from back in the day that had undoubtedly seen better days. Closer inspection proved that it had been engineered with a 10-percent setback-style, and the existing firewall, A-pillar, and driver-side floor had been cut off the car and tacked back on. Ron saw potential. The pusher was hauled back to his shop.

It didn't take long to tear the car down to a pile, and it was determined the original spine was too far gone to reuse. A clean, original frame was then sourced to kick-start the build. In order to retain some of the car's vintage drag spirit, he modified the wheelbase to 119 inches, followed by nailing a 1968 Chrysler 8 3/4-inch rear out back filled with 3.55 gears matched to custom-fabbed ladder bars, leaf springs, and tube shocks. To bring plenty of nostalgia up front, the original tube axle was deftly matched to 1948-'54 Chevy spindles, parallel leaf springs, and tube shocks. If you're planning to go fast, you'd better have plenty of stopping power, so juice flows through

a GM twin-bowl master via steel lines to Chrysler drums out back and 1970 Camaro discs up front. Nothing says gasser like an original set of Fenton wheels wearing M&H skinnies up front and Towel City cheater slicks out back.

If you want to make an impression on the street or at the dragstrip, nothing brings more attitude to the party than a well-massaged vintage 396ci Chevy big-block. Ron had Furiani Racing of San Dimas, California, assemble a total fire breather, starting with a base filled with a steel GM crank linked to matching rods and TRW pistons. A COMP Cams stick sets the thump while a set of massaged GM oval port heads help make loads of power. Fuel flows through a pair of 1965-era Holley 390-cfm carbs with mechanical linkage tweaked by Performance Carb perched atop an Edelbrock TRX2 tunnel-ram intake. MSD lights the fire while gasses dump through period-correct Hooker fenderwell headers to a custom 3-inch stainless exhaust and Black Widow mufflers. Classic details like the Offenhauser finned aluminum valve covers and velocity stacks settled atop the carbs add the right amount of nostalgic flavor to the combination putting out a rock-solid 500 hp at 6,500 rpm. Power moves rearward through a GM TH400 reworked by Speedway Trans to a custom driveshaft.

Since the car had been beaten to death over the past few decades, Ron had his work cut out to bring the body back to life. His tasks included replacing the floors and outer rockers, reworking the quarter-panels and package tray, and massaging every inch of the vintage steel back to perfection. Once completed, the car was handed over to the talented team at Flaco's Customs of Montclair,

California, to make the final bodywork razor sharp and prep it for a decadent coating of Axalta Clear Water Blue. Once the reassembly was completed, Tom Clark was turned loose to add the wicked graphics bringing the car a new life.

To keep the car within its era-correct parameters, the original rollbar remains anchored in place accented by a custom-painted original dash, engine-turned aluminum, and vitals monitored through a combination of stock and Stewart-Warner gauges. Sew Cal Upholstery of Ontario stitched up a time-perfect interior covering the JAZ Products buckets and side panels in biscuit-style vinyl and floors in blue loop-pile carpet.

Ron yanks the gears through a B&M stick while he navigates via a blue metalflake Mooneyes steering wheel, with tunes flowing through a JVC head unit to Kicker amps and speakers.

As with any large project, there are necessary acknowledgements, and Ron would like to thank good friend Dave Dewoody of Out of the Past Customs in Ontario, California, for all his help throughout the build.

All in all, it's just plain bitchin to see another sky-high '55 once again doing time on the streets and offering a glimpse of what hot rodding was like back in the good ol' days. **CHP**



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# UP STAGED

## LS Turbo Cam Test

❖ TEXT & PHOTOS: **Richard Holdener**

**W**e know that the LS engine family responds well to changes in cam timing and that, like every engine ever made, the LS also responds favorably to boost. The question isn't whether you can get power from a cam swap or from boost, but whether your boosted LS will respond to a dedicated turbo cam. While it's certainly possible to add boost to an otherwise stock LS engine — from the lowly 4.8L LR4 to the massive 7.0L LS7 — a stock cam is somewhat less than ideal for an engine equipped with forced induction, especially a turbocharger. As with any combination, the trick is to tailor the actual valve events to the cam timing needs of the engine. Boost will certainly wake up your stock LS, but the right camshaft will take things to the next level.

This test was designed to illustrate what happens when you apply a dedicated turbo cam to a turbocharged LS application.

Truth be told, it is easy to tailor any LS cam test to make us look like heroes. Simply install the mildest stock LS cam (the 5.3L LM7) and then replace it with almost any other cam on the market. Included in that upgrade list are all of the other factory LS cams, including the one we decided to use as the baseline for this test: the LS9.

I know what you are thinking, "Why run a cam designed for a supercharged application in a turbo engine?" The answer is simple: we chose the LS9 because of its position as the most powerful factory cam offered. This is a position it shares with the nearly identical LS7 cam, but since the LS9 was designed for forced induction, it got the nod over the equally powerful LS7. Having previously tested all of the factory LS cams on a 5.3L for our sister publication *Car Craft*, we know firsthand how all of the factory offerings stacked up. Choosing the most powerful of the factory grinds (already up 70 hp over the LM7) elevated not only



▲ Boosted LS engines are nothing new, but does a turbo engine require specific cam timing?

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the power output of the baseline, but put even more pressure on the dedicated turbo cam to deliver on their promise of power.

To properly test the turbo LS cam, we first needed a turbo LS engine. While an ordinary LS might suffice, we built anything but an ordinary LS test engine. Code-named Hybrid, the turbo test mule combined a big-bore LS3 (6.2L) block with a short-stroke LR4 (4.8L) crank. The resulting combination yielded 339 cubic inches thanks to 6.30-inch Lunati rods and custom JE forged pistons. Additional components included an ATI Super Damper working with a complete Moroso oiling system using an F-body oil pan, pickup, and windage tray. We employed Crane lifters and hardened pushrods activating the stock rockers. Since head flow is a critical element in power production, we topped the big-bore hybrid with a set of Trick Flow Specialties GenX 255 LS3 heads and a Holley Hi-Ram intake manifold. The Hi-Ram was configured with a FAST 102mm throttle body and 83lb Holley injectors controlled by a Dominator EFI management system. To establish our





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## Up Staged



**01** | To properly test our boost cams, we built a dedicated test engine. The short-block featured an LS3 block stuffed with a 4.8L crank, Lunati rods, and custom JE pistons. Note also the ATI Super Damper, Moroso oil pan, and Fel-Pro head gaskets.



**02** | Topping the short-stroke LS3 hybrid was a set of TFS GenX 255 heads. The rectangle-port (LS3) heads flowed an amazing 385 cfm.



**03** | Just as important for our needs was the fact that the GenX 255 heads featured a spring package that allowed us to safely run cams sporting as much as 0.650-inch lift.

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**04** | Finishing off the TFS-headed LS3 was a Holley Hi-Ram intake and FAST 102mm throttle body.



**05** | Ensuring adequate fuel for the turbo engine was a set of 83lb injectors fed by a set of billet fuel rails from Holley.

baseline, the hybrid was configured with a factory LS9 cam.

We had the engine portion of the turbo engine covered so now it was time for some boost. The positive pressure portion of the equation was provided by a custom single-turbo system that included a pair of DNA Motoring tubular turbo manifolds feeding a custom Y-pipe. The front-mounted Y-pipe included V-band attachment flanges, a T4 turbo flange, and a pair of flanges designed to accept 45mm Turbosmart HyperGate wastegates. The wastegates were set up to limit boost pressure supplied by the 76mm Precision



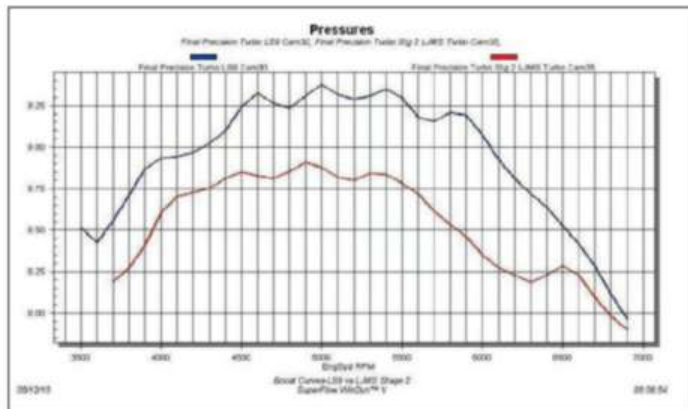
turbo to just 7 psi. Given the fact that this turbo was capable of 25+ psi and 1,200 hp, it wasn't even breathing hard during this cam test. Despite the relatively low boost level, the heated charge air was channeled through an air-to-water intercooler from Cxracing. The free-flowing core featured a 3.5-inch inlet and outlet, and dropped the charge temps by over 90 degrees. The discharge pipe connecting the intercooler to the throttle body featured a Turbosmart Race Port BOV (blow-off valve). Run with the LS9 cam, the turbo LS produced 701 hp at 6,500 rpm and 598 lb-ft of torque at 5,500 rpm. Despite the 7-psi wastegate setting, the boost pressure started at 8.5 psi, rose to 9.4 psi, then dropped back down to 8.0 psi.

With a peak power output exceeding 700 hp, obviously the LS9 cam was no slouch, but we were anxious to install the turbo cam from Lil John's Motorsport Solutions. Compared to the factory LS9 cam, the Stage 2 grind offered an additional 15 degrees of intake duration but just 1 degree more of exhaust duration. The Stage 2 cam also featured a much tighter LSA (by nearly 10 degrees). What effect did

♦ As expected, the dedicated turbo cam offered significantly more power than the LS9 blower cam. The Stage 2 cam offered an additional 32 hp, jumping from 701 hp to 733 hp.



♦ It is interesting to note that the turbo cam offered both power gains and a drop in boost (and back) pressure. This, despite no changes to the Turbosmart wastegate setting (we ran on the spring).



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06 |

Holley also supplied the Dominator fuel management system for our testing.



07 | The custom, single-turbo system included a pair of tubular headers from DNA Motoring feeding a custom Y-pipe designed to accept a T4 turbo.

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08 | Keeping things cool was an air-to-water intercooler from Cxracing. Note the temperature probe used to monitor the air temps exiting the turbo.

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09 | Boost was supplied by this Precision 76mm turbo. Capable of supporting 25+ psi and 1,200 hp, the Precision piece was just getting started at 8.0 psi.

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these changes have on the power curve? Equipped with the Stage 2 cam, the peak power numbers jumped to 733 hp and 621 lb-ft of torque. Remember, this came with no change to the wastegate setting. It is also important to note that the cam upgrade actually dropped the boost pressure by as much as 0.5





**11** | Out came the LS9 cam and in went the Stage 2 cam from Lil John's Motorsport Solutions (LJMS).



**10** | The baseline tests were run with a factory LS9 cam. The LS9 offered 0.562-inch lift, 211/230-degree duration split, and 122.5-degree LSA. Equipped with the LS9 cam, the turbo LS produced 701 hp and 598 lb-ft of torque.



**12** | This sensor in the collector allowed us to monitor the changes in boost and backpressure from cam to cam.



**13** | The Stage 2 cam offered a 0.605/0.598-inch lift split, a 226/231-degree duration split, and a 113-degree LSA. Replacing the LS9 cam with the Stage 2 cam from LJMS increased the power output from 701 hp and 598 lb-ft of torque to 733 hp and 621 lb-ft of torque.

psi. The dedicated turbo cam not only made more power but did so with less boost pressure. Every bit as important was the fact that the turbo cam improved power across the entire powerband. With more power and less boost, it's safe to say the Stage 2 cam easily up-staged the factory LS9 cam. **CHP**

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RIDES

# SCHALK

Steve Schalk's decade-long Nova project build threatened to kill him, but instead it made him smarter

✦ TEXT & PHOTOS: **Chris Shelton**





# AND AWE

It isn't the nearly 600 cubic inches of engine that makes Steve Schalk's Nova stand out. Nor is it the chopped top (bet you didn't see that coming). Those things give his Nova incredible presence but the thing that makes the car amazing is its story.

You see, this car's presence anywhere, much less a major publication, is a major accomplishment. During the car's construction Schalk got hosed so frequently that he damn near — and probably should have — walked away. The enthusiastic seller's modest asking price should've been a red flag. "From the outside, the car seemed in OK condition," Schalk admits. But — and there's almost always a "but" when you score a great deal — he discovered something shoved the right front wheel into the floor. Blasting the car revealed a heavily plowed rear.

But Schalk carried on. He hired a shop to build a chassis behind a Chris Alston front clip. A friend then referred Schalk to another friend to finish the framework. Then

— and this should stand as another red flag — the twice-removed friend referred Schalk to another friend who reportedly knew how to tin the interior.

The work took a year. But worse than that, the friend welded the wheeltubs to the quarter-panels, warping them. "His sheetmetal resembled ductwork," Schalk laments. But unlike HVAC craftsmen, this one left gaps as large as half an inch.

After storing the car for a year, Schalk gutted the work and replaced the rear quarters with N.O.S. ones he found on eBay. He also clipped the rear with a good donor. Of course that wasn't the end. The left side bulged. The passenger wheelbase was half an inch shorter than the driver side,







and the frame wasn't level. "The line-up shop told me that I could just cut and weld little sections into the current frame," he says, laughing.

Thus began the real work.

Schalk scrapped the entire chassis, including the front clip just for superstition's sake. He made a jig in his garage and built a new one from Art Morrison components. He aligned the body and built a floor, firewall, and wheeltubs from 14-gauge steel. Duane Luckow formed panels to fill the area behind the rear wheels.

"After all the interior sheetmetal was in the car I took some body classes from Pat Nesbitt at Clackamas Community College," Schalk continues. After several terms, Nesbitt visited Schalk's house frequently to lend a hand. "This was like on-the-job training," Schalk muses. "One day I mentioned chopping the top," he says. He and Nesbitt clipped 3/4-inch from the windshield posts only. "I think we had the whole thing done in less than a day," Schalk brags.

Nesbitt taught Schalk paint basics and left him to his

wits. He sprayed the underside in PPG Midnight Sapphire Blue. "Whenever painting your first car," he warns, "don't learn with a tri-coat." Mitch Kim and Dick Pruitt laid out flames. Jason Crider at Portland's STB Coatings finished the chassis prior to its reassembly. Then Schalk got ambitious. He welded the front fenders to the body and fender supports. He also designed inner front fenders and welded them to the front subframe downtubes, fender supports, firewall, and core support.

Schalk negotiated with a painter and paid in advance. The deal fell through. "He backed out and said he couldn't and wasn't interested in completing the car for SEMA," Schalk laments. Nor was he interested in refunding the advance. Fat Wallet Customs came to the rescue. "They did an awesome job," he praises.

Schalk coated every interior surface with Lizard Skin insulation and sound damper. After dropping the car off at a stereo shop for wiring, another cloud rolled in: divorce. Best of all, the stereo shop bungled the job. Schalk and Ashley





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Beene wired the American Autowire harness themselves. Holcomb Upholstery replaced the stereo shop's interior panels, shedding more than 200 pounds in the process. Holcomb trimmed the panels and 2006 Pontiac GTO seats in light-gray Spinneybeck leather and suede. The floor wears tufted-wool carpet.

Luckow fabricated the aluminum insert for the Stewart-Warner Maximum Performance gauges. Schalk mounted a Vintage Air Gen II Super Cooler and double-vane Streamline vents in the dash. Flaming River made the Cascade steering wheel and tilt column. Electric Life gear powers the windows and door poppers. A Kenwood head unit in the console feeds Exile and Hertz components. He also adorned the windshield with a Mito Corporation rear-view mirror. A CompuSTAR alarm and Drone mobile GPS-tracking system protects the investment.

Yes, the car has an engine. It's had two so far, the first a casualty of a builder's sloppiness. Portland's Tim Schnell based this one on a Merlin III Pro Block. Manley 4.56-inch pistons and a 4.50-inch Eagle crank give it 588 ci; 119cc chambers

in World Products' Merlin 3 heads give it 10.2:1 static compression. The 259-degrees at 0.050-inch duration in a Howards 128525-14 cam bleed enough pressure to run pump gas. Massive 2.6-inch oval butterflies in a Morrison Motorsports X Ram manifold feed the pump. An Accel Gen7 DFI meters fuel and controls an Accel distributor. Aeromotive pumps in a stainless Rick's Hot Rod Shop tank pressurizes the system.

Canby's BBC Steel water-jet-cut an accessory-drive system that Schalk designed. It mounts a Wrangler NW 150-amp alternator. A Meziere Enterprises pump-and-radiator combo regulates temperature. A Richmond 4+1 transmission with a McLeod flywheel and clutch couple to the 588ci, 600hp monster. A pair of 2-inch Stainless Works headers flank it on their way to an exhaust that Kasey Squires at Punks Muffler in Battle Ground, Oregon, assembled from 3-inch round and oval tubing.

An aluminum Dynotech driveshaft transmits power to a 3.50:1 gear on a Moser limited-slip carrier in a Bill Scribner-built 9-inch axle. It in turn spins Moser 31-spline shafts. A stainless four-link

suspension ties the axle to the chassis. A set of QA1 coilover dampers bear the chassis' load.

An underdash Kugel Komponenten pedal assembly transmits force to a Wilwood brake system consisting of 12-inch drilled-and-slotted rotors and six- and four-piston calipers. Bolted to those are 17x9 and 18x13 Rushforth Livewire wheels. They wear 225/45 and 335/30 Michelin Pilot Sport hides, respectively.

Vancouver's Kevin Batey cut glass to fit the openings. Harold Wallace straightened the stainless trim; Virgil Hobbs polished it. Electro-Chem Metal Finishing anodized the aluminum. Brad White at City Machine whittled the side-mirror stanchions for Muth turn-signal mirror heads.

A dark cloud overshadowed what should've been a fun period in Schalk's life. But there's always a silver lining. This one gave him the opportunity to do for himself, and as his car proves he rose to the occasion.

It was expensive and frustrating for sure, and the job took a full decade to complete, but Schalk has one hell of a story. And if anyone doubts it, he has the proof, a sapphire-blue trophy to show for it. **CHP**



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# HISTORY CAMARO HIGHS AND LOWS

Contrasting the best and worst from the first five generations of Chevy's iconic performer

❖ TEXT: Barry Kluczyk | PHOTOS: The Author AND General Motors

➔ **With the introduction** of the sixth-generation Camaro, it's worth looking back over the car's long, storied history to contrast the milestones that helped make it an automotive icon with a few of the admitted misfires. It all weaves a colorful and important tapestry for a car that is inextricably linked with American culture and affordable, attainable performance. We've selected 10 highlights and lowlights; so let's get started.

**High:** Camaro goes on sale on September 29, 1966, and is an instant success, racking up 220,906 sales in its first model year – including 602 built with a special handling package known by the order code Z/28.

**Low:** For the sake of development expediency and production value (read: low cost), the original Camaro is based on the existing Chevy II architecture. It wasn't a sports car, but then again, neither was the Falcon platform on which the original Mustang was built. So there.

**High:** Camaro paces the Indianapolis 500 for the first time on May 30, 1967, and again on May 30, 1969. Production replicas of the 1969 models, with their

distinctive Hugger Orange stripes and orange houndstooth interiors, go on to become iconic examples of the Camaro's first generation and remain popular collector models.

**Low:** Camaro convertible production ceases after 1969 and won't return until 1987.

**High:** Camaro's racing legacy starts strongly on the dragstrip and road course with Bill "Grumpy" Jenkins claiming the 1967 NHRA Super Stock championship in his all-new, L78 396-powered Camaro, and Penske-backed Camaros driven by Mark Donohue ripping through SCCA's Trans-Am series. Donohue





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## Camaro Highs and Lows



↑ The Camaro debuted in late 1966 to enthusiastic Baby Boomers clamoring for Chevy's entry in the all-new "ponycar" segment. More than 220,000 were sold in the first year.



↑ First-year Camaros featured a single-leaf rear suspension design that hobbled performance. This RS/SS owner is clearly calling the dealer to ask about axlehop during her stoplight-to-stoplight run-ins with Mustangs and Barracudas.



↑ Chevrolet built 3,675 convertible replicas of the 1969 Camaro Indy Pace Car, some with 350 engines and others with the 396. All wore Hugger Orange stripes and interior trim. It would be the final year for Camaro convertibles for more than 15 years.



↑ Working in conjunction with Chevrolet Racing Director Vince Piggins, Bill "Grumpy" Jenkins helped establish the Camaro's racing cred on the dragstrip. It is believed this car may have been the first Camaro built with the L78-code 396 engine, rated at 375 hp. Regardless, it's a piece of drag racing history.



↑ After an inauspicious start with the 1967 Camaro, the Penske racing team experimented with a lightweight body using acid-dipped sheetmetal. It worked, and the car was updated with 1968 Camaro body components in an effort to field two cars at the Sebring 12-hour race that year. This car, owned by Patrick Ryan, has been restored to its 1968 Sebring appearance, where it won the Trans-Am class and finished Third overall.



↑ With solid lifters, an aggressive camshaft, and a stout 11:1 compression ratio, the 1970 Z28's LT-1 engine represented the pinnacle of performance for second-gen Camaros. They are fairly rare these days. Fewer than 9,000 of the nearly 125,000 1970 Camaros built were Z28s.

was the winningest driver in 1968 and 1969, claiming the unofficial driver championships. They weren't officially awarded until 1971, which Donohue won.

**Low:** Bill Jenkins switched to a Vega in 1972, ultimately revolutionizing NHRA Pro Stock with a 1974 model featuring a purpose-built chassis with a strut-type suspension. It would become the blueprint for Pro Stock race cars – and it was a Vega, not a Camaro. Mark Donohue also ditched the Camaro and drove an AMC Javelin when he won the championship in 1971.

**High:** Second-generation Camaro debuts in 1970 with an all-new, purpose-built architecture shared by no other vehicle in Chevy's lineup. It was also the pinnacle for second-gen performance, with the 360hp LT-1 engine in the Z28 and 375 hp from the available 396 big-block (it really displaced 402 cubes).

**Low:** Industry-wide regulatory changes cause precipitous drops in compression ratios and consequently power ratings by 1971 – a factor exacerbated by a change from gross power ratings to more realistic net ratings. The LT-1's horsepower rating therefore drops from 360 to 275 hp.

The big-block exited the scene after 1972. The muscle car era was over.

**High:** For 1975, organizers of the International Race of Champions replace Porsche race cars with identically prepared Camaro race cars. Camaros would be used in the series from 1975-'80 and 1984-'89 (the series wasn't run from 1981-83). The popularity of the IROC series eventually drove Chevrolet to release the IROC-Z model in 1985.

**Low:** Camaro V-8 output bottoms out in 1981 with an anemic 267ci (4.3L) version of the small-block rated at a measly 115 hp and 200 lb-ft of torque. It was also the



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## Camaro Highs and Lows

→ The Camaro was a track star in the IROC racing series from the mid-1970s through late-1980s. The series featured identically prepared race cars driven by the best drivers from different forms of racing, from open-wheel and Sprint cars to NASCAR.



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↑ The Camaro's popularity exploded through the mid- and latter-parts of its second generation, even though performance dropped like the watermelons off the roof in an old David Letterman bit. This '76 Camaro is wheezing its way up the mountain, pulling every lb-ft out of its 140hp 305 small-block.



↑ The Camaro helped define the late 1970s and sales reached their all-time high in 1979, at 282,571. Nearly 85,000 of them were Z28s. Most ended up on the cover of *Car Craft*.

year Chevy Chase did the flick *Modern Problems* and the national unemployment rate was 7.6 percent. In other words, it was a tough year.

**High:** Camaro production hits its all-time high in 1979, with 282,571 – including nearly 85,000 Z28 models. Wow. Numbers like that today would make the Camaro one of the best-selling cars in the industry.

**Low:** Jeff Spicoli (Sean Penn) wrecks Charles Jefferson's (Forest Whitaker) 1979 Z28 while cruising with Jefferson's brother in the classic 1982 movie *Fast Times at Ridgemont High*. Not to worry, though. He can fix it. His father is a television repairman with the ultimate set of tools.

**High:** All-new, third-generation Camaro introduces a radical redesign in 1982 that would help define the high-tech cultural



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⬆ At least one of the nearly 85,000 1979 Z28s built was sacrificed for cinematic art in *Fast Times at Ridgemont High*, when Jeff Spicoli's time at the wheel ended in disaster – although he offered to fix it with his father's "TV repairman" tools. More than 30 years later, we have to ask: What the heck is a TV repairman?



⬆ The third-generation Camaro was a radical departure that, like the preceding generation, would help define the culture of its decade. It was also designed as more of a true performance car, with a greater emphasis on aero and a more responsive suspension system, including rack-and-pinion steering and a strut-type front suspension.



⬆ Behold the glory of the four-cylinder third-gen Camaro powerplant – and we use "power" subjectively. The 151-cubic-inch Iron Duke derivative was offered in carbureted and throttle-body injection versions, but none cracked the 100-horsepower threshold. Sad.

aesthetic of the decade. The 1982 Z28 was the first American production car to incorporate ground effects in its design and all models incorporated modern strut-type front suspensions. It was also named the *Motor Trend* Car of the Year.

**Low:** Yes, Virginia, they made four-cylinder Camaros from 1982-86

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## Camaro Highs and Lows

➔ The LS1 engine, introduced in the Camaro in 1998, returned a level of performance that hadn't been seen since the heyday of the muscle car. Better still, it responded to upgrades such as camshafts and cylinder head porting like a fedora-wearing hipster let loose in a vinyl-only record store.



➔ The Camaro's timeline came to a temporary end in 2002, when production ended after 35 years. This is the very last fourth-gen Camaro built, and it is part of GM's collection of historic vehicles.



➔ Chevrolet signaled the Camaro's return with a decidedly retro interpretation introduced as a concept vehicle in 2006. The production Gen 5 model would thankfully be executed almost identically to this dramatic, expressive concept.



➔ Chevrolet showed the *Transformers* movie cars at the Gen 6 reveal event in Detroit, in May 2015.

— and the less said about those Iron Duke-derived anchors, the better. Output ranged from a struggling 88 hp to a lackluster 92 hp.

**High:** The Gen III small-block V-8 known as the LS1 is introduced in the 1998 Z28 and SS models, ushering in a new era in high performance. It's hard to

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↑ The Gen 5 Camaro was a sales and cultural phenomenon, helped in no small part by its role in the *Transformers* movies. Chevrolet even built a Transformers Edition in 2010.



← The Camaro Z/28 returned to its road course roots in the fifth generation and the result was nothing short of spectacular, amazing, and all the other superlatives one could pry out of a thesaurus. Its track-ready suspension and 505hp LS7 engine compose a literally world-beating combination – and represents Chevrolet at its very best.

understate the impact the LS1 and the subsequent members of the LS engine family have had on the automotive performance world. They have fundamentally changed the way hobbyists and racers alike approach performance and established new benchmarks for streetable performance cars. Seriously.

**Low:** The LS1 is not enough to save sinking Camaro sales. They bottom out at only 29,009 worldwide in 2001 and GM pulls the plug on the F-body on August 27, 2002, ending production after 35 years. Bummer.

**High:** Chevrolet shows a retro-styled Camaro concept vehicle at the 2006 North American International Auto Show in Detroit, previewing the 2010 production model that would go on to become a cultural icon through channels such as the *Transformers* movies. It also proved to be the right car at the right time, as Gen 5 sales have exceeded 500,000 and outpaced Mustang for four straight years. USA-1, indeed.

**Low:** Not that we're complaining or anything, but the production Gen 5 Camaro debuted on the porky side; and

its junk in the trunk made handling and overall performance a bit less than sharp or exhilarating. Outward visibility wasn't so hot, either. Hey, we're still fans, but just sayin'.

**High:** The Gen 5 Camaro Z/28. Yes, the SS, 1LE, and supercharged ZL1 are mucho terrifico, but the Z/28's driving experience is from another plane of existence – and comparing it with other Camaro models is like comparing the Millennium Falcon with a Cessna 172. It's that good. In fact, in a *Motor Trend* comparison that helped solidify the Z/28's position as the magazine's 2014 Best Driver's Car – the first American car so-awarded – it was pitted against a Nissan GT-R Track Edition and a Porsche 911 Turbo S. The rear-wheel-drive Z/28 lapped the track faster than both all-wheel-drive competitors, prompting the editors to proclaim, "It stands as one of the absolutely best track-focused cars in the world."

**Low:** 2015 was the final year for the Gen 5 Z/28, and there ain't one on the docket for 2016. Get one now while you can. **CHP**

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- 1982-87 Monte Carlo
- 1966 (late)-67 Chevelle
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- 1968 Chevelle
- 1966-67 Nova
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But that reality doesn't occur in an instant or a month or a year. Often it painfully unfolds, anticipation leaking, like a slow-motion image in time-lapse photography. But this record is the real story of the car, of its rampant growth throttled by a too-long stretch in chassis jail and clouds of tar-pit torpor.

"When I was 11 years old, I played football and my teammate's father would drop him off at practice in a black 1967 SS Chevelle. From the first time I saw it, I was hooked on that Chevelle," Chad Longo confessed. "I have owned my Chevelle for six years and it took me six years to build it." Chad is 43 and had been sweeping the horizon for his soul mate since he was 25 but couldn't find one that wasn't







# G IRON

Thunder Roadie Chad Longo and His Dusky A-body Thrive in the Inland Empire

❖ TEXT: **Ro McGonegal** | PHOTOS: **Tim Sutton**

compromised by a little too much oxidation. He waited, got antsy, got distracted. Rather than focusing on the Chevelle, he was waylaid by a gang of Tri-Fives.

Eventually, a friend clued him into a '67 SS that was in pieces, scattered in someone's garage, and had been that way for 10 years. Then, in 2003, a small apocalypse ensued. There were terrible fires in the foothills of the San Bernardino mountains. All structures surrounding the garage were razed to the ground, but the building holding the Chevelle was unscathed. "It was a sign," gushed Chad.

The owner wanted \$4,000. The body was on a rotisserie but Chad couldn't be certain that all the trinkets were there, so he offered half of that. The guy blanched. Chad walked away empty-handed. Then fate stuck its head around the corner. It was Thanksgiving Day ... and the Chevelle guy's wife wanted cash for Black Friday sales. The guy relented.







Chad hooked up his trailer, peeled his brother Ric off the couch and took off to get the thing. His mother was perturbed, sure that they wouldn't be back in time for the Big Turkey dinner. Chad gave the guy two grand and trundled his puzzle away. He and Ric made it back to the table just as Mom was getting the bird out of the oven.

"I couldn't sleep for the next four days trying to figure out how I was going to build it," he said. A branding iron to the brain will do that to you. "I wanted to keep the traditional look. I also wanted all the cool things there are for this car but I wanted to keep it subtle and simple. The toughest decision was whether to keep the stainless trim and the chrome ... or pitch it. A friend imparted these words: "Do you want it to look classic or do you want it to look mean as hell?"

Prior to the blast-off, Chad gathered the troops: brother Ric was in for the overall design (parts, accessories, wheels, and paint scheme); Miguel Rosales would do the interior; Mark Harrison at Harrison Racing & Fabrication was responsible for the chassis as well as the sheetmetal finishing; Kevin Currell's Sik Fabrication would do the bumpers; Jason Russell took on the final bodywork and paint at Arkane Customs; Dave Basham at BMS Machine built the engine, and Westech Performance's Eric Rhee toiled over the tuning. Chad did the glasswork, wiring, trim work, engine accessories, minor fabrication, and the final assembly.

Chad's original notion was a supercharged 572, but his friends were rallying around the LS platform like celebrants at the Burning Man festival out in the

Nevada desert. The 6.0-liter truck engine he scrounged off Craigslist for a grand had a cast-iron case that was deemed preferable – to the more common alloy – for famously absorbing boost. Since Basham had worked for Banks at one time, he knew about a pair of prototype turbo-specific LS cylinder heads being developed for a project ultimately aborted and he was able to lay hands on them.

Chad: "Eric at Westech was pretty impressed with the power it put out. He couldn't get it to hook on the dyno when hitting Second gear, so we still don't have accurate torque and power readings. He's guessing anywhere between 700-750 horsepower on the conservative side. Needless to say, I'm





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## TECH CHECK

**Owner:** Chad Longo, Ladera Ranch, California  
**Vehicle:** 1967 SS Chevelle

### Engine

- Type:** GM LQ4 iron cylinder block
- Displacement:** 366 ci
- Compression Ratio:** 9.0:1
- Bore:** 4.00 inches
- Stroke:** 3.62 inches
- Cylinder Heads:** Gale Banks Engineering prototype
- Rotating Assembly:** Manley 4340 forged crankshaft and connecting rods, SRP pistons
- Valvetrain:** COMP Cams roller lifters and pushrods
- Camshaft:** COMP Cams (270/277-deg. duration at 0.050; 0.588/0.569-inch lift), GMPP timing set, custom rocker covers
- Induction:** Kenne Bell supercharger at 10 psi boost (blueprinted and tweaked by Eric Rhee), Aeromotive A1000 fuel pump
- Ignition:** Computer by CBM (Rancho Cucamonga, California), GM coils, CBM primary wires, Powermaster alternator
- Exhaust:** Edelbrock headers, 2 5/8-inch primaries, ceramic-coated, custom 2.5-inch system with crossover pipe, Flowmaster 40 series mufflers
- Machine Work/Assembly:** Dave Basham at BMS Machine, San Bernardino, California
- Output (estimated at wheels):** 680 lb-ft at 5,200 rpm, 750 hp at 6,500 rpm
- Tuner:** Eric Rhee, Westech Performance, Mira Loma, California

### Drivetrain

- Transmission:** Turbo 400 by Luke's Transmission (Riverside, California), 2,800-stall speed, reverse-pattern manual valvebody
- Rear Axle:** Harrison Racing & Fabrication 9-inch, Detroit Locker differential, 3.50:1, Yucaipa, California; Ed Moore Driveline prop shaft, San Bernardino, California

### Chassis

- Front Suspension:** Heidts 2-inch drop spindles, tubular control arms, QA1 adjustable coilover dampers, splined NASCAR-style antisway bar



- Rear Suspension:** Frame narrowed 5 inches per side, gusseted and reinforced, 3-link with adjustable Panhard rod, adjustable upper and solid lower links by Harrison Racing & Fabrication, QA1 adjustable coilover dampers, splined antisway bar
- Brakes:** Wilwood vented 14-inch rotors, six-piston calipers, front; Wilwood 12.5-inch rotors, four-piston calipers, rear

### Wheels & Tires

- Wheels:** Rushforth Livewire; 19x8 front, 20x12 rear
- Tires:** Michelin Pilot Sport; 245/40 front, 335/30 rear

### Interior

- Upholstery:** Miguel Rosales, Riverside Custom and Classic Auto Interiors
- Material:** Leather
- Seats:** Procar Rally, Crow Blackbird belts
- Steering:** ididit adjustable brushed aluminum column, Budnik Velocity wheel
- Shifter:** TCI Outlaw, custom console by Miguel Rosales
- Dash:** OE
- Audio:** None
- Instrumentation:** Classic Instruments All-American Traditional Series, fabricated panel inset
- HVAC:** Vintage Air

### Exterior

- Bodywork:** Jason Russell, Arkane Customs, Corona, California
- Paint by:** Jason Russell, Arkane Customs
- Paint:** House of Kolor Black
- Hood:** Original SS
- Grille:** Original SS
- Bumpers:** Sik Fabrications, Corona, California

a happy man with that kind of report from those guys!"

Though the car languished two years in body shop jail, it gave Chad's friend Miguel Rosales a lot of breathing room to formulate and execute the elegant, decidedly low-key habitat. "We wanted it to be different than any other Chevelle. He spent months making it perfect for me without a single complaint," said Chad. During the transformation, Rosales created a smooth, fluid console that complements the rest of the man cave. Perforated hide bookends the smooth surfaces and lends some tension and visual escape from those fields. Other cues include Clayton Machine Works pedals that sparkle from the footwell gloom. The doors and trunk are outfitted with a Klassic Keyless remote system. Rather than the accepted no-nonsense gauge faces, Chad opted for the whimsy of Classic Instruments. In all, the cockpit is understated and serene.

The outstanding passenger compartment segues wonderfully with the stark richness of the ebony body, a non-color that reveals, yeah sometimes shouts, every imperfection at a single glance. You don't know the discipline of block-sanding and panel-gapping a body in black until you've done it ... over and over and over again. But that was none of Sik Fabrication's concern. All Kevin Currell had to do was put up those fabulous bumpers, especially the one on the front with the subtle lip spoiler that appears to be freestanding. We'd call it art.

So about a year ago, another long-haul project quietly came to fruition. Though it appears like the work of some big name builder with an obscene price commensurate, it was wholly and wonderfully crafted by locals. With the dust motes still swirling, we asked Chad what he would have done differently. Just one thing. Since the frame modifications took such a long time to complete, he'd be disposed to a chassis from Art Morrison or the Roadster Shop.

It kind of goes back to the branding iron image thing that has haunted Chad since his nascent years. He'll never forget the sound of the engine the first time it was fired or the day that Miguel finished the interior. Truly, Chad has found happiness with his belt-fed weapon. **CHP**





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S226-CHGT



# Holiday Gift Guide



It won't be long before the Holiday Season arrives in full swing, and there's a good chance you could use a little help in getting a few gift ideas for that hot rodder in your life. Well, your pals at *Chevy High Performance* got ya' covered. Once again we've put together our annual Holiday Gift Guide stuffed with plenty of goods to satisfy most any gearhead. Whether you are looking for performance parts, appearance accessories, or cleaning products, there's a good chance you'll find it right here in the *Chevy High Performance* Holiday Gift Guide.



SPEC, the innovator in GM LS clutch technology, introduces their new line of single-disc performance clutches for C5 and C6 Corvettes. The new design is currently shipping and features the same extreme capacities you would expect from a SPEC clutch, but with a pedal effort reduction of over 10 percent and no measuring/shimming and no hydraulic upgrade installation. These kits have the same release window as the original self-ratcheting units, but with the increased performance, reliability, and safety these cars demand. The kits support power levels up to an amazing 1,000 lb-ft of torque for the street/strip units and 1,200 lb-ft for drag-specific units.

**SPEC INC.**

800.828.4379

[www.specclutch.com](http://www.specclutch.com)

**SPEC**  
CLUTCHES & FLYWHEELS



Kenne Bell large-displacement and more efficient billet Twin Screw superchargers turn less rpm to develop the same boost with lower parasitic loss. This translates into huge horsepower gains with plenty of room to grow. Kenne Bell's 100 percent stock '10 Camaro test car with a standard Mammoth 2.8 kit and 20 psi with E85 pump gas achieved 800 rwhp. Even larger 3.2, 3.6, 4.2, and 4.7 kits are available. All kits include industry leading 4.5-inch Mammoth CAK and new Hi Density Core BIGUN Intercooler. Patented Liquid Cooled optional.

**KENNE BELL**

909.941.6646

[www.kennebell.net](http://www.kennebell.net)

**KENNE BELL**



Performance Online's 1955-57 Chevy Bel Air Deluxe Engine and Transmission Mount Kits (TCM5557D) includes Everything Needed to install your hot new engine and trans into your Tri-Five. Engine mounts will accommodate small and big blocks and are available in the stock location or 3/4-inch forward, for those running HEI. The mounts are powdercoated black for a nice appearance and corrosion resistance. The transmission crossmember will accommodate most GM transmissions and is designed for maximum exhaust clearance. Rubber mounts are included but can be upgraded to polyurethane, and LS conversion mounts.

**PERFORMANCE ONLINE**

714.278.0098

[www.performanceonline.com](http://www.performanceonline.com)

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PerformanceOnline.com





Speed Dawg Shift Knobs offers a huge selection of premium quality gearshift handles including a full line of GM Officially Licensed shifter knobs. Several new styles and colors have been added and custom orders are available. All Speed Dawg shift knobs are manufactured to the highest quality standards and are made in the USA.

#### **SPEED DAWG SHIFT KNOBS**

866.906.7801 (IN U.S.)  
717.741.2665 (OUTSIDE OF U.S.)  
[www.speeddawg.com](http://www.speeddawg.com)



New Port Engineering has been the leader in windshield wiper upgrades for over 27 years. They offer over 180 all-new, bolt-in motor replacement kits and complete wiper assemblies for many popular GM, Ford, and other classic cars and trucks. Standard features include a modern, heavy-duty, two-speed, self-parking motor that is smaller and more powerful than the original. Options include intermittent delay switches and washer pump kits. See the complete application list at [www.newportwipers.com](http://www.newportwipers.com). Drive through the rain in safety with a New Port wiper upgrade.

#### **NEW PORT ENGINEERING**

636.239.1698  
800.829.1929  
[www.newportwipers.com](http://www.newportwipers.com)



The GM Muscle Car line of suspension products from Chris Alston's Chassisworks offers a selection of simple front and rear suspension upgrade packages for popular 1955-'02 GM passenger cars. Kits include powdercoated front and rear antiroll bars matched with VariShock direct-replacement, billet-aluminum, smooth-body shocks or coilover struts in factory-valved, single- or double-adjustable versions. A great upgrade choice for moderate budgets.

#### **CHRIS ALSTON'S CHASSISWORKS**

888.388.0298  
[www.cachassisworks.com](http://www.cachassisworks.com)



Lokar offers a Throttle Cable Mounting Bracket and Spring Return Kit for 4150 Series Carburetors (Holley, Demon, Quick Fuel, etc.). Intended for street applications, the kit includes provisions for a throttle cable and a transmission kickdown cable, also available from Lokar. Each kit includes stainless steel return springs with dual-wound ends for safety and also has adjustable spring tension. Fits with most drop-base air cleaners and works with single- or dual-plane intake manifolds. Designed to be installed under the carburetor using four mounting bolts or studs (not included). Available in brushed or black finish.

#### **LOKAR, INC.**

877.469.7440  
[www.lokar.com](http://www.lokar.com)



Classic design meets modern technology with YearOne's line of upgraded, cast-aluminum wheels for Chevy muscle cars. Designs include the Corvette Rally, the Magnum, the five-spoke Z28, and the N90, all in 17-inch diameters. Complete wheel kits with lug nuts and center caps ship free in the continental U.S.!

#### **YEARONE**

800.YEARONE  
[www.yearone.com](http://www.yearone.com)



MuscleRods offers everything you need to drop an LS-based engine into your Chevy. Not only do they offer engine mount and crossmember kits that are specifically designed for your car, or the best options for headers and oil pans. Now available are the other components to finish your conversion. Drop in LS radiators, fuel systems, and front accessory drives that are all designed to work together. It's all just a click away.

#### **MUSCLERODS**

770.751.0687  
[www.musclerods.com](http://www.musclerods.com)







Ten years after its 2005 introduction, Fatman has redesigned their Camaro stub to use their GTech tall spindle and Sportalign system, which allows easy and repeatable dual settings for Interstate and track! Any 1967-'69 Camaro brake system will fit this spindle, saving your already spent dollars.

## FATMAN FABRICATIONS

704.545.0369

[www.fatmanfab.com](http://www.fatmanfab.com)



Classic Performance Products' Hydra Stop is a direct fit, high-performance hydraulic brake assist system. These systems work great when running a performance engine setup and there is not enough vacuum produced to operate a traditional booster. Simply plumb into your power steering system and share the fluid reservoir of your power steering pump with your high-performance brake system. Kit includes: high-pressure line set, heavy-duty return line, pedal rod and mounting hardware. Assembled with all-new parts, this unit puts out an amazing 1,800 psi at the wheels. Street Beast package also includes aluminum Corvette-style master cylinder, side-mounted Prop & Stop Block kit, and all necessary fittings and hardware.



## CLASSIC PERFORMANCE PRODUCTS

800.830.7657

[www.classicperform.com](http://www.classicperform.com)



Classic Performance Products' 500 Series steering box provides late-model steering technology with a 14:1 ratio and all-new components. These new boxes bolt directly to your frame without any need for additional brackets or adapters, and utilize the original power steering pitman arm. They use a 3/4"-30 coupler and inverted flare (11/16"-18 pressure and 5/8"-18 return) hoses. Direct replacement applications are available for 1967-'87 C10 trucks, 1967-'79 Camaros, 1967-'77 Chevilles, and 1968-'79 Novas. Custom applications are also available for fullsize 1955-'64 Chevys. Boxes start at \$379 and complete kits start at \$599. Get yours today!



## CLASSIC PERFORMANCE PRODUCTS

800.830.7657

[www.classicperform.com](http://www.classicperform.com)



Classic Performance Products has introduced C5 Uprights/Spindles that are a direct bolt-on for Chevilles, Camaros, and Novas. The upright/spindle utilizes a C5 bearing hub assembly to greatly reduce flex on the factory spindle pin and eliminate caliper piston push back. The C5 Upright/Spindles utilizes C5 brakes or any other aftermarket alternative options such as Wilwood, Brembo, and Baer. The early A-, F-, and X-body tall spindle helps with improved geometry by giving a better camber change during suspension movement. This spindle offers superior performance for a great price!

## CLASSIC PERFORMANCE PRODUCTS

800.830.7657

[www.classicperform.com](http://www.classicperform.com)



Classic Performance Products carries a wide variety of Classic Fit EFI fuel tanks with built-in trays and appropriate fittings. These are original fit tanks and require no modifications to properly install. Utilizing original fill positions, they simply mount like the factory tank. This is the best choice for adding a fuel-injection-ready tank to your classic vehicle. These kits include the mounting straps and hardware. Available separately are the proper fuel pumps, sending units, fuel regulators, as well as a complete fuel line plumbing kit to make CPP your one stop shop for your LS engine/fuel injection conversion.

## CLASSIC PERFORMANCE PRODUCTS

800.830.7657

[www.classicperform.com](http://www.classicperform.com)



The HTP Striker Digital Welding Helmet gives you a whopping 12.25 square inches of viewing area! Along with welding, cutting, and grinding modes, you have precise adjustment over all the welding parameters with the digital controls. Four arc sensors mean the helmet will never lose sight of the arc. \$139.95 includes free shipping.

## HTP AMERICA/USAWELD

800.USA.WELD

[www.usaweld.com](http://www.usaweld.com)





Delta PAG's high-performance brushless cooling fans use cutting-edge technologies for ultimate cooling performance.

Moves over 2,800 cfm at only 2.70 inches thin - Reduce amp draw (only 13 amps for 2,800 cfm) - Increase reliability (lasts 10x longer) - Infinitely adjustable - Soft-Start tech eliminates power spikes - The thinnest, most efficient 2,800-cfm fan on the market - With Delta PAG's digital controller you can adjust speed and on/off temperatures for two fans independently. Also, control fans with your OEM/aftermarket computer. Fan kits include everything you need, such as waterproof wiring harness, digital controller, brushless fan and sensor. No relays or temp switches are needed for a brushless system, increasing reliability. A fabricated custom aluminum shroud can be had for only \$89. Complete cooling packages also available: radiator, shroud, and fan(s) for any vehicle for as low as \$600.

#### DELTA PAG

212.203.2912

[www.deltapag.com](http://www.deltapag.com)



Undercover Innovations has got you covered, literally. If you have an overheating problem with your classic car, Undercover Innovations might have a solution for you. Or if you're tired of looking at the unattractive front of your radiator, let them dress it up. GMs, Fords, Mopars—models are added all the time. Licensed by GM, engraved logos and custom engraving is also available. Valve covers with custom engraving are available, too.

#### UNDERCOVER INNOVATIONS

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March Performance offers more options and more experience. With 24 years of experience and thousands of parts, they have the correct solution for you. March Performance has quality serpentine systems, brackets, and pulleys for Chevy, Ford, Chrysler, Olds, Buick, and AMC. Rugged clear powdercoating ensures years of lasting beauty, no polishing required. They also have chrome and other custom finishes. Let their tech crew assist you in customizing the correct kit in your price range for you.

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Analog Display ("SlideBar" to the left)



Digital Display ("SlideBar" to the right)



The latest to come from Custom Autosound! The most original-looking, direct OE fitment radio ever produced. Over three years in development. Perfect for your '68-76 Corvette. The radio face appears analog but with a slide of the "SlideBar" the digital display is revealed. Radio features include: 300 watts, AM/FM RDS tuner with 25 presets, USB flash drive player, Subwoofer line out, iPod connectivity, CD changer controller, Bluetooth option, aux input, seven LCD color choices w/ dimmer, Bass/Mid/Treble tone control, DSP EQ. MSRP: \$299.

#### CUSTOM AUTOSOUND

800.888.8637

[www.customautosound.com](http://www.customautosound.com)



Ron Francis' Wiring BlackBox Relay System is a 2014 SEMA Award Winner. This fully programmable, state-of-the-art relay system allows full control of 10 individual relayed circuits. Control power windows, door locks, fuel/water pumps, fans, and more with this all-in-one unit. A bluetooth module for BlackBox remote control and programming will be available soon.

#### RON FRANCIS WIRING

800.292.1940

[www.ronfrancis.com](http://www.ronfrancis.com)







Baer is renowned for its performance braking systems, and the company has applied the same engineering expertise to the Remaster, a fully machined, billet aluminum master cylinder. The Remaster is available with right or left port configurations and screw-on billet caps, making checking and adding fluid easier. The Remaster also offers the option to bolt a Baer proportioning valve directly to the bottom, for a cleaner installation and look. The Remaster is a direct replacement for other master cylinders, and is available in 15/16-, 1- and 1-1/8-inch bore sizes. Standard finish options are gray or black anodized and polished, a variety of custom finishes are also available. Remaster is proudly made Phoenix, Arizona.

**BAER BRAKES**  
602.233.1411  
[www.baer.com](http://www.baer.com)



The School of Automotive Machinists (SAM) offers programs in block, head, and CNC machining. SAM now offers an Associate of Applied Science degree in Automotive Engine/Block and Cylinder Head Machining for students wanting to continue their academic education. The school has a 95 percent placement rate, placing graduates in the motorsports industry for the past 25 years.

## SCHOOL OF AUTOMOTIVE MACHINISTS

713.683.3817  
[www.samracing.com](http://www.samracing.com)



Impala owners, Global West Suspension now manufactures tubular upper and lower control arms for the front and rear of 1971-'96 models. The arms have improved geometry, use Del-a-lum bushings, and are fully assembled so they're ready for immediate use. Coilover lower control arms are available that support the latest adjustable shock and spring combinations. The coilover shock kit from Global West allows you to adjust ride height for that perfect look. Police and taxicab lower arms are part of the lineup so you can now use the bigger ball joint spindles over the standard B-body applications.

**GLOBAL WEST SUSPENSION**  
877.470.2975  
[www.globalwest.net](http://www.globalwest.net)



Complete your LS engine swap with Energy Suspension's LS-Series Motor Mount Conversion Set which is now available with PN 3.1108 transmission mount to transplant an LS-Series motor into most conventional style, three-bolt Chevy cars and trucks. The combo set includes Energy's HYPER-FLEX polyurethane interlocking motor mounts (tall or short style), mounting plates, transmission mount and hardware. Available in zinc plate or chrome finish and are offered in red or black polyurethane. Made in America.

Part Numbers:

Short & Wide Chrome Finish 3.1167

Tall & Narrow Chrome Finish 3.1169

\*Add to part number G for Black and R for Red.

## ENERGY SUSPENSION

888.292.1250  
[www.energysuspension.com](http://www.energysuspension.com)



Interactive jewelry for men and women. Tug on your heartstrings with the Gear Necklace by sliding the pendant along its chain and setting the gears in motion. Spin in style with the Gear Ring by turning the outer rims so that all the gears rotate in unison. Patented. Lifetime Warranty. Free Shipping

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[www.kinektdesign.com](http://www.kinektdesign.com)



Own a 1947-'87 GM truck and want to give your truck the smooth appearance and great operation of one-piece glass? If so, Brothers Trucks has you covered. Their specially designed one-piece glass kits are painstakingly designed for easy installation and use. This special cut of glass allows for complete sealing around the window and easy roll-up or down operation. Each kit has the option of upgrading to power window for the ultimate in style and convenience.

## BROTHERS TRUCKS

800.977.2767  
[www.brotherstrucks.com](http://www.brotherstrucks.com)







CarCapsule USA, the original Car Bubble, introduces the ultimate in vehicle storage solutions: The ShowCase. CarCapsule produces a variety of styles and options to preserve and effectively protect your classic, vintage, or collector car, bike, or powersport craft from dings, dust, and the elements. It's not a cover, it's a ShowCase.

#### CARCAPSULE USA

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[www.carcapsule.com](http://www.carcapsule.com)



RestoMod Tanks offers an affordable fuel tank solution for muscle cars running aftermarket EFI or GM Gen III engines. Each tank is based on a brand-new, stamped-steel design with modern requirements such as proper venting, exhaust clearance, and the ability to easily run a GM-style fuel pump module or their billet Dynamic module. Available for a variety of GM muscle cars with more applications in development.

#### RESTOMOD TANKS

915.760.4523

[www.restomodtanks.com](http://www.restomodtanks.com)



Cold Air Inductions puts the "cold" back into cold air intake. Tired of seeing the same old, outdated, and ineffective heat shield design from competitors, Cold Air Inductions enclose and insulate the airbox and apply a protective thermal coating to the intake tube. These insulating properties mean less heat soak and cooler intake air temperature, which means more horsepower, torque, and fuel economy. Made in the United States.

#### COLD AIR INDUCTIONS INC.

810.392.9999

[www.coldairinductions.com](http://www.coldairinductions.com)



The ACS-T4 front splitter from ACS Composite is designed to enhance the front end of your Camaro. Model-specific splitters are available for all LT and SS Camaros. Improve airflow for greater downforce while retaining the same side height of your car.

The splitter is designed with a complete under-covering panel to protect the undercarriage and spread the load at high speeds. Installation hardware and instructions are included; the splitter can be installed in roughly 30 minutes.

#### ACS COMPOSITE

514.828.1000

[www.acscomposite.com](http://www.acscomposite.com)



Update and improve your 2010-'13 Camaro hood. Introducing the latest ACS Composite Hood Conversion System for the 2010-13 Camaro LT and SS: the 4Teen Hood Extractor (PN 33-4-175). Installation kit includes a '14 SS Hood Extractor insert, water tray panel, trimming templates, hardware, and installation booklet to guide you through the conversion. Improve cooling efficiency while keeping your lightweight OEM aluminium hood.

#### ACS COMPOSITE

514.828.1000

[www.acscomposite.com](http://www.acscomposite.com)



QA1's REV Series Driveshafts are available in 3.2- and 3.7-inch diameters for vehicles producing up to 2,000 hp with a max torque of 1,500 lb-ft. According to QA1, these carbon-fiber driveshafts are lighter, stiffer, and stronger than aluminum, steel, and other carbon-fiber driveshafts, and provide dramatic safety benefits. With superior strength and stiffness, all QA1 REV Series Driveshafts are custom made in Lakeville, Minnesota.

#### QA1

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[www.qa1.net](http://www.qa1.net)





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**• Drill 28 Hole Sizes**

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**CENTRALPNEUMATIC 40 LB. CAPACITY FLOOR BLAST CABINET**

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**SAVE \$120**

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**580 lb. Capacity**

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**12 VOLT, 10/2/50 AMP BATTERY CHARGER/ ENGINE STARTER**

**CENTECH**

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**SAVE 62%**

**\$29.99**

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# REINCARNATION PART 2

Some Rear Braking and Suspension Parts Gives this 1967 Chevelle Much-Improved Street Manners

✦ TEXT & PHOTOS: **Steven Rupp**

In part one of this install we told you the story of our cool looking but miserable-to-drive 1967 Chevelle. We've all driven an old Chevy that has crummy brakes and sketchy handling, but these days a fix is only a bit of cash and few handtools away.

We started by ordering up Classic Performance Products' (CPP) Stage IV Pro-Touring kit (PN 6467PTK-4, \$3,599). This kit came with almost everything we needed to upgrade the Chevelle's suspension and brakes. To complement these parts, we also added in a 500 series close-ratio steering box (PN CP50004) and the vacuum brake booster we upgraded to CPP's Hydra Stop system.

With the front bits installed, it was time to turn our attention to the back end

of our classic Chevy. Like the front, all of the parts are basic bolt-on deals, and compared to many of the kits on the market, they certainly fall more into the affordable category. We also managed to test out the new brakes to see if the performance would back up the good looks. If you missed part one of this story, be sure to check it out at [chevyhiperformance.com](http://chevyhiperformance.com). **CHP**





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AD #CH21315



## Reincarnation Part 2

**01** | Our 1967 Chevelle may have had factory front disc brakes, but the rears were the typical drum deal. They looked to have been recently serviced, but that didn't seem to help their performance. Before the car was taken apart, we did a little testing, and the best stopping

distance on new high-performance tires was 156 very sketchy feet. And, after that hard hit, the brakes clocked out early. They also had a nasty tendency to lock up and nearly spin the car.



**03** | And here's what we were left with. The existing brake hardline will eventually be replaced with new, pre-bent brake lines supplied in the CPP kit. They also supplied both a 10-bolt and a 12-bolt differential cover gasket.



**05** | And here's how the caliper bracket bolted to the housing flange. Note that the bolt at 4 o'clock wasn't used at this point in the install.

**07** | With the axle reinstalled and the diff buttoned back up we then installed the new 12-inch slotted, drilled, zinc-washed rotor and bolted on the CPP caliper. The calipers had to mount forward to provide clearance for the shocks.



**02** | Before we could remove the backing plates we had to pull the axles, and before we could do that we needed to release the C-clips in the differential. To do this, we pulled the cover off of the 12-bolt, carefully rotated the diff till it was in this position and removed the small bolt (seen with blue thread locker on it). We then removed the pin (a magnet helps if it won't drop free) and wiggled out the C-clips. With the pin out, we made sure not to spin the diff in any way, or parts would have started falling out of place.



**04** | CCP included a stack of caliper bracket shims and new T-bolts in the kit. How many shims you'll need depends on your flange. The only way to find out is to test fit the caliper and see if it ends up centered over the rotor. They also include new rear wheel studs; they weren't any longer than what we already had, so we were good-to-go.



**06** | The single-piston CPP floating caliper is really all that's needed on the back of a car. One nice feature is it also contains the parking brake.



**08** | In addition to the rear sway bar option (PN OPTION-RSB2, \$50), we also got fancy with CPP's deluxe rear billet poly/aluminum mounts (PN RBM-DKM25, \$129).





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## Reincarnation Part 2

**09** | The billet bushing mount looks a lot better than U-bolts and were much easier than welding on sway bar support pads.



**10** | The upper brackets were bolted to the frame and then the links were adjusted and attached to the sway bar. The bar itself has three points, so the roll stiffness can be tuned for the car. For now we set it on the last hole, which is the softest.



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**11** | Part of improving the handling of any car is stiffening up the suspension in terms of flex. Our Chevelle actually had nicer parts than most we've seen since it was fitted with a rear sway bar and factory "boxed" lower trailing arms.



**12** | But even the upgraded, boxed GM trailing arms bend and flex a lot compared to these tubular pieces from CPP. The bars came with the urethane bushings already installed.

**13** | Not much to say about installing the lower trailing arms since they simply bolted in place of the old ones using the new Grade 8 hardware supplied by CPP.





**14** | It's pretty easy to see how much stronger the new upper arm is compared to the stamped steel stocker. The other huge benefit is that it's adjustable, so we can fine-tune the pinion angle and better align the rear end.



**15** | The hardest part of the entire rear suspension is typically swapping out the upper control arm bushings in the rearend housing.



**16** | Normally, we struggle with this bushing, but fortunately CPP sells this sweet 4-in-1 ball joint service set (PN BJT, \$79). In addition to easily removing and installing ball joints, it's also quite adept at removing and installing rear control arm bushings.



**17** | We lubed up the new bushing and tapped it into the housing until it bottomed out. We then installed the new upper control arm. To make sure we were in the ballpark, we set the length of the new upper arm the same as the stocker that was removed.



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## Reincarnation Part 2



**18** | Another upgrade we opted for was CPP's coilover conversion kit (PN PTK-RCOILOVER-SA, \$229). This will allow us to easily dial in the rear ride height on our Chevelle, and besides, coilovers are just cool. As you can see, there's a lot of hardware involved, but installation was pretty straightforward.



**19** | Here you can see the main shock bracket assembly. The larger spacers went between the two plates while the short ones went between the rear plate and the existing shock mount welded to the rearend housing. The system utilized the existing shock mounting hole, but we had to drill a hole for the upper bolt. If you look closely you'll notice that the plates have a slight bend in them. This adds a ton of strength to the finished assembly.



**20** | The rear coilovers were single-adjustable billet QA1 pieces and a CPP coil spring. Besides being great looking (especially compared to the stock shock), this will let us dial in the ride/handling of the Chevelle in addition to its ride height.

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**21** | And here's the coilover shock mounted under the Chevy. We lucked out and just managed to clear the exhaust, but keep in mind that the coilover conversion does take up a bit more space than a standard shock.



**22** | The bump stop simply bolted to the rear end using the supplied riser bracket.



**23** | CPP offers these Trailing Arm Mount Adjustable Braces (PN 6467TAMB, \$89). We couldn't add them due to our mufflers being too far back, but if you have space, they're a great idea. Here's a picture of them mounted to one of CPP's display frames. The bar ties the rear of the upper trailing arm to the rear of the lower trailing arm and adds a lot of chassis stiffness.



**24** | And with that we were done with the install and could get the Chevelle down to our local alignment shop. The new parts look great, but more importantly they should help this 3,700-pound Chevy negotiate the curves a whole lot better.



**25** | When the Chevelle showed up to the shop it rolled on 15-inch Rally wheels. They wouldn't clear the new brakes, so we tossed on a set of 18-inch rollers from Showwheels. Even with better tires, the braking performance was awful, with a best stopping distance of 158 feet. Keep in mind that was with the rear locking up. With the new suspension and brakes, we again tested the car and were rewarded with a best stopping distance (from 60 mph) of 125 feet. Best of all, it was 125 drama-free feet. Even after six all-out hits, our stopping distance was still a respectable 129 feet. Six hard stops on the old brakes would have imbedded us in a tree.



# VOLUMETRIC

RIDES

Small motor. Big Turbo

TEXT: Ro McGonegal | PHOTOS: Eric McClellan



➤ **Most people build** cars strictly for pleasure ... and they certainly do it for bragging rights. But some do it for expediency. In Minnesota, there are a couple of young lions who crafted this Camaro as a marketing tool more than some sort of a personal triumph. They don't adhere to the norm. They buck accepted wisdom. But they wanted to burn rubber as badly as we do and get that 2x4-whacked-in-the-middle-of-the-back sensation. Frankly, they considered the coupe a portal to another realm.





# C EFFICIENCY



Chris Carey (30) and Kyle Nelson (29) are the co-founders of Modern Automotive Performance (MAP) up there in the Minneapolis bedroom of Cottage Grove, hard by the Mississippi River. Historically, these guys built quite a following in the sport compact cosmos, especially with the enhancement of or addition of turbocharging, and were ready to explore territory uncharted. A little piece of Americana would do nicely, they thought, constitute a righteous platform instantly identifiable and cherished beyond words.

Their refrain was familiar. "Not only did we want it to accelerate faster, we also wanted to turn faster and stop

faster all the while enjoying modern amenities like air conditioning, so the car was built to accomplish two things. It's a demonstration of MAP's capabilities and to help us expand into a new market, including domestic vehicles and LS-based platforms," said Chris. "The '69 Camaro, as the chassis was in our price range and would certainly garner attention." That the first-gen has been thoroughly used up in the popularity contests did not seem to deter them.

The philosophy was such: While there are enthusiasts who prefer originality, there are many more who don't want to slog through all that matching-number crap and willing to trade that for a more modern setting with improved fuel





economy, capability, and reliability. Even the envelope was respected. Chris: “Blemishes in regards to the body and paint were left untouched as we intended for this car to be driven without fear of tarnishing show-quality paint. We did want to make sure that it looked and performed well. We wanted to prove that this was in fact a 10-second car. On the track, it ran a 10.70 at 129.”

An eBay listing drew their attention to the Camaro. The owner was local but the car was a Deep South refugee, hence relatively uncompromised by the ages and the weather. Since MAP is a full-service facility, in a little more than a year the boys were able to compose this poem for about \$55,000 and a bucket or two of sweat equity. In a world where appearance counts for way too much, we applaud these lads for their demeanor, their reluctance to be universal, and for their function-over-form perspective. It smells sweet and it smells wholesome and they did it much like a *CHP* reader might. They used an economical engine, an offbeat transmission, and some of the latest handling and stopping tricks, and those giant wheels on the back. Not a lick of bodywork or paint. Ha! They nailed it.

Who would start off with an obscure truck motor in the first place? The 5.3L is cheap and strewn across the landscape in dog-poop proportion. To support the turbo app, they might have taken the cast-iron cylinder version (LM7) but an LM4 with an aluminum case is what they got. They kept the tune-up out of Kamikaze territory and they changed out all the fasteners with ARP stuff,

especially in the area of cylinder head sealing. That 12 psi positive manifold pressure threshold is arbitrary. There is no need for more—but, hey, turning up the wick is a rudimentary alternative.

Most of the thought in this combination focuses on the power system. As has been proven time and again, even the cast components in the lowliest LS engine can withstand the adversity of juice or boost in great quantity without shedding a single tear or drop of oil. In this instance, the MAP men crawled the motor and custom-built a kit that includes tubular manifolds and a Turbosmart 45 wastegate and 50mm blow-off valve. They used one Precision Turbo 7675 turbocharger and plumbed it to a 3.5-inch thick MAP heat exchanger (with billet end tanks) at the front of the car. Ancillaries include a MAP-ported throttle body and a mandrel-bent exhaust aft of the turbocharger.

Can a GM car coexist with parts originally meant for a Ford? In another marked departure from the everyday grind, Mr. Carey and Mr. Nelson deemed an AOD transmission as the proper choice and sourced it from one of the leading proponents, FB Performance in Bay Shore, New York.

To contain the grunt and keep its operation controlled and linear, the MAP men maintained subjectivity and built the suspension system with a variety of pieces rather than adopt someone else's ideal wholesale. Furthering the Pro Touring ethic was not the primary agenda; creating their own device was. They included





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components from Global West, QA1, Classic Performance Products, Unisteer, Summit Racing, as well as TCI's new torque-arm rear suspension to consolidate the chassis and help set the stance. Detroit Speed mini-tubs accommodate those critical 12-wides.

Although they avoided the outer body, they smoothed the firewall, removing the original A/C box and they cleaned and painted the undercarriage proper. They simplified things with a Vintage Air GEN-IV system that operates with microprocessors rather than "analog" cable controls. As for the wiring matrix, MAP modified the OE harness and tucked away all the tendrils (including those for the motor) for a clean, uncomplicated finish.

Carey and Nelson have firm belief in word-of-mouth, realize the vast potential in "social media" and they have reacted accordingly. But they are doers, not spiteful couch potatoes, so they merge with the world in active participation and foster MAP's Boost For A Cure, the MAP Proving Grounds sessions (two this year) at Brainerd International Raceway, Car Craft's Summer Nationals, Powercruise USA (at BIR), and they materialize at the Cars & Coffee gatherings every month. They are stuck in this stuff like a wooly mammoth with two feet in a tar pit. **CHP**

## TECH CHECK

**Owners:** Chris Carey, Kyle Nelson, Cottage Grove, Minnesota  
**Vehicle:** 1969 Camaro

### Engine

- **Type:** GM Gen-III LM4
- **Displacement:** 323 ci
- **Compression Ratio:** 9.5:1
- **Bore:** 3.78 inches
- **Stroke:** 3.62 inches
- **Cylinder Heads:** Stock LM4, Howards dual valvesprings
- **Rotating Assembly:** Nodular iron crankshaft, powdered metal connecting rods, hypereutectic pistons
- **Valvetrain:** Stock rocker arms with COMP Cams trunnion upgrade, Howards 7.4-inch chromoly pushrods
- **Camshaft:** Howards (specs proprietary)
- **Induction:** C5 Corvette intake manifold, Modern Automotive Performance (MAP) air cleaners, ported throttle body, Spectre EFI fuel tank, TI Automotive 400-lph pump, Seimens Deka 80 lb/hr injectors, single Precision Turbo 7675 turbocharger, air-to-air MAP intercooler
- **Ignition:** GM truck coil packs, MAP custom billet brackets
- **Exhaust:** MAP manifolds, Turbosmart 45 wastegate and 50mm blow-off valve, 3-inch system
- **Oiling System:** Melling pump, modified BPR Hot Rods LH8 aluminum sump
- **Output (at wheels):** 542 hp, 558 lb-ft at 12 psi boost
- **Tuner:** Modern Automotive Performance, Cottage Grove, Minnesota

### Drivetrain

- **Transmission:** FB Performance AOD with manual valvebody, trans brake, PTC torque converter
- **Rear Axle:** Narrowed Quick Performance Ford 9-inch, limited-slip differential, 3.50:1 gears, custom driveshaft with Proven Force 1350 U-joints

### Chassis

- **Front Suspension:** Classic Performance

Products spindles with C5 unit bearing, welded subframe seams, Global West solid subframe bushings, TCI connectors and torque arm, CPP tubular control arms with Delrin bushings, QA1 coilovers with 550 lb-in springs, Summit Racing antisway bar

- **Rear Suspension:** RideTech single-adjustable coilovers, TCI antisway bar, four-point MAP rollcage
- **Brakes:** CPP C5 Corvette 12.6-inch drilled and slotted discs, front; Quick Performance 12-inch drilled and slotted discs, rear; CPP booster

### Wheels & Tires

- **Wheels:** Forgeline DE3P; 18x9 front, 18x12 rear
- **Tires:** BFG g-Force Rival; 275/35 front, 335/30 rear

### Interior

- **Upholstery:** New OE-style headliner, carpet and door panels, dashpad
- **Material:** Cloth
- **Seats:** Corbeau
- **Steering:** Unisteer power rack, Grant Formula wheel
- **Shifter:** Turbo Action SCS Cheetah
- **Dash:** Stock
- **Instrumentation:** Dakota Digital VHX
- **Audio:** Kenwood head unit, Arc Audio 5-channel amp, Memphis 2x8-inch subwoofers with custom enclosure/deck lid kit, Memphis 6.5-inch two-way front speakers with custom kick panel enclosures
- **HVAC:** Vintage Air Electronic

### Exterior

- **Bodywork:** Original
- **Paint:** LeMans Blue (Code 71)
- **Hood:** Stock
- **Grille:** Stock
- **Bumpers:** Stock





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# MAT IT!

## Holley's New HydraMat Offers an Easy Solution to EFI Fuel Pickup Headaches

♦ TEXT & PHOTOS: **Jeff Smith**

**S**elf-learning electronic fuel injection (EFI) systems have made converting to fuel injection far less painful. This has removed complicated EFI tuning as an excuse not to convert. But a far less celebrated requirement for successful EFI conversion is a reliable fuel delivery system capable of maintaining a constant high-pressure supply of fuel to the injectors. The biggest hurdle to creating a professional fuel delivery system is ensuring there is always a constant supply of fuel to the inlet side of the pump. That would seem simple enough, but for EFI-equipped cars, it's a challenge. Until now, this required a custom fuel tank with fabricated reservoirs, or adapting late-model factory reservoir pumps into an early Chevy muscle car.

If you just bolt a horizontal electric fuel pump to the outside of a muscle car fuel tank and connect it to the stock pickup along with a return line – that will work – until the fuel level drops below half a tank. Then acceleration-induced fuel tsunamis inside the tank push the fuel away from the pickup. As soon as the pump

sucks air, fuel pressure drops to near zero, the engine stumbles badly, and you're underwhelmed with the results. The quick solution is to always keep the fuel tank near full, which works, but this is hardly a realistic solution. Now, let us introduce you to Holley's HydraMat.

We first witnessed the HydraMat's amazing fuel-sponging abilities at a demonstration in Holley's booth at the SEMA show last year. A small mat rested at the bottom of a clear plastic tank measuring roughly 14x18 inches.



**01** | The HydraMat offers an easy way to improve fuel pickup efficiency for EFI systems that demand that the fuel pump always have a constant supply of fuel. The HydraMat can be used on virtually any type of fuel tank of any configuration.



There was about a half-gallon of fluid in the tank that was tilted at a severe angle so that only a couple square inches of the mat contacted the fluid. Holley's Bill Tichenor engaged a fuel pump and "fuel" immediately began exiting and circulating back to the tank.

Tichenor explained that the HydraMat is a patented material that will pull fuel from any location on the mat as long as fuel is in contact while simultaneously closing off the rest of the mat to prevent pulling air into the inlet stream. If you've ever tried to pull soda through a straw that has a crack in it above the liquid line, you know that it doesn't work very well. The HydraMat uses tiny pores to close off any portion of the mat that is not in contact with fuel. This presents an immediate advantage for retrofitting early muscle cars with an EFI system. Even better, Holley says the mat is compatible with most automotive fuels, including gasoline, ethanol, E85, and even methanol. The HydraMat is not compatible with diesel fuel.

The HydraMat forgoes the necessity of a custom reservoir in the tank because it will be able to pick up even the lowest fuel level remaining in the tank. Because of the tremendous variety of potential uses, Holley has created nine different HydraMat configurations, from a single rectangle measuring 15x3 inches to a full-size 15x15-inch mat for large fuel cells.

In the center of each HydraMat is a plastic fitting for either a 3/8- or 1/2-inch NPT fitting. Some of the larger HydraMats use a -10 AN inlet hose fitting. This is important because reducing the inlet restriction is a great way to improve pump efficiency. These fittings allow you to connect the HydraMat to the fuel pump inlet with a simple hose. In addition to the mat operating like a giant sponge, the HydraMat is also an equally large fuel filter. Holley says the mat is essentially a 15-micron pre-filter over its entire surface so no additional pre-filter should be used. Holley's testing indicates the mat should be capable of a life expectancy in a typical street car of six years or 60,000 miles. In off-road applications where dirt is an issue, the service life will be reduced.

Each corner of the HydraMat is also fitted with a 5/32-inch mounting hole. Available separately, Holley offers slick magnetic mounts for steel tanks that will retain the HydraMat in the tank with small 6-32 machine screw pins. For polypropylene tanks, you have the option of strong magnets that can be placed on the outside of the tank

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## Mat It

that will adhere to the inner magnets to retain the HydraMat. A third option, for aluminum tanks is a Click Bond kit using epoxy that glue mounts to the bottom of the tank.

Perhaps the biggest concern is installing the HydraMat in an OE fuel tank. For Chevy muscle cars, this is tight, but not impossible. The standard sending unit hole measures 1.900-inch diameter, so it's possible to squeeze the PN 16-105 rectangular HydraMat through the stock sending unit hole in the tank even with a 3/8-inch fitting and

rubber hose attached to the mat. The key is to attach everything to the mat, including the magnetic mounts, and then carefully squeeze the mat into the tank.

For later-model tanks or aftermarket fuel cells, the installation will be much easier. Generally, these tanks offer larger inlets that allow easier access to both install and position the HydraMat in the tank. Holley recommends using either convoluted PTFE hose from the tank to the pump or in-tank rated rubber hose, which is also available from Holley.

While the HydraMat does seem to



**02** | Holley offers the HydraMat in nine different configurations and sizes. The smallest, (lower right), is a simple strip 15x3 inches, while the largest is a 15x15-inch square. All Holley HydraMats come with a fitting in the center using either a 3/8- or 1/2-inch NPT fitting to feed the fuel pump inlet.



**03** | Depending upon the size of the mat, the center pump feed will either be a 3/8- or 1/2-inch NPT thread. In the photo is a 3/8 NPT to -6 male fitting for a braided hose or a 3/8-inch hose barb for a submersible rubber hose.



**04** | The HydraMat should be secured to the bottom of the tank so it does not move. Small holes in the corners of each mat are intended for small, threaded-pin magnets that secure the mat to the tank. For steel tanks, this PN 16-204 kit uses magnets with 6-32 machined studs and locking nuts to secure the mat to the tank.



**05** | We managed to squeeze the small 15x3-inch HydraMat through a stock Chevelle sending unit hole gas tank. Holley suggests lining any sharp-edge tank inlets with duct tape to protect the HydraMat during installation. With a fitting, 3/8-inch fuel line, and magnets in place, we were able to squeeze this packaging to a stock Chevelle fuel tank.

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**06** | Here's the small HydraMat located inside a stock Chevelle tank with the top removed so you can see how this is configured. The mat is held in place by the magnets and connected with a 3/8 rubber line to the stock fuel sending unit with a 3/8-inch return line brazed in place to complete the return, which is zip-tied to the inlet line.



**07** | This tight view shows the magnets holding the HydraMat to the tank floor. These magnets are really strong and require significant effort to move so the mat will stay secure.



**08** | For plastic fuel cells, Holley sells a second magnet kit that uses the 16-204 kit on the inside, retained with very strong magnets located on the outside of the tank (PN 16-205), as illustrated by this plastic red box with the pin magnet on the inside is held in place by the magnet on the outside.

offer an excellent and low-cost solution to EFI fuel delivery problems, there is an important point that should be covered. The ideal location for any high-performance EFI pump is inside the tank. There are multiple reasons for this. While using the fuel in the tank to cool the pump is a good starting point, the main reason for placing the pump inside the tank is to optimize pump inlet efficiency. With the pump inlet sitting as close to the floor of the tank as reasonable (which the HydraMat does very well), the vertical column of fuel sitting above the inlet has weight that presses down on the fuel, which dramatically improves pump performance.

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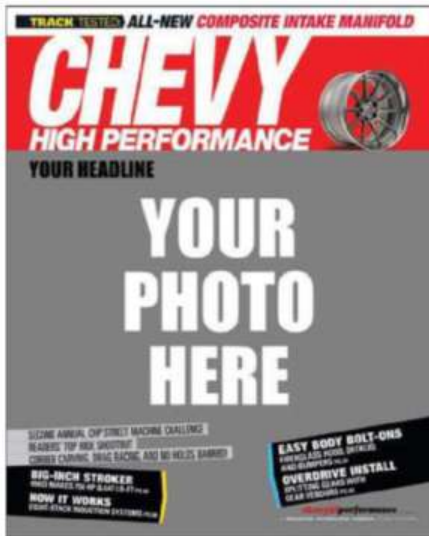
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## Mat It



**09** | The HydraMat could also be used with an existing modified tank like this one that already has a reservoir installed. Because the pump is already located in the tank, a HydraMat could be a low-cost upgrade.

The opposite of this is when the fuel pump is located outside the tank and above the fuel level. This is a good place to mention that pumps do a great job of pushing fuel but are far less efficient on the inlet side. So everything you can do to push fuel into the pump will improve both efficiency and lifespan. Conversely, if the pump has to work to pull fuel in, efficiency is reduced. This means, “pulling” fuel up any vertical distance will make the pump work harder, which puts additional heat into the fuel. Worse, the pump must create low pressure (vacuum, if you will) in order to draw the fuel into the pump. Any time a liquid, including gasoline, is exposed to low pressure, this lowers the liquid’s boiling point. A lower boiling point combined with additional heat in the fuel means that more air bubbles will form in the fuel on the inlet side. This will further reduce pump efficiency. In worst-case scenarios, heat and vacuum create what is commonly referred to as vapor lock. The pump stops working because heat and low pressure have combined to vaporize most of the fuel on the inlet side of the pump.

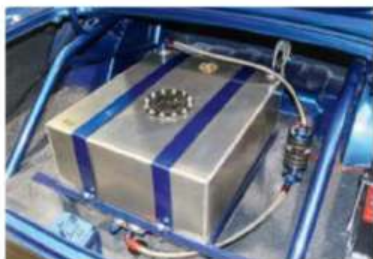
We’ve run through this rather lengthy explanation to emphasize how important fuel pump mounting location is with regard to making your fuel delivery system perform as efficiently as possible. The HydraMat is not a band-aid for poor pump location. If it is not possible to mount the pump inside the tank, at least position the pump as low as safely possible outside the tank so that atmospheric pressure will help push the fuel into the pump.

But beyond these pump placement concerns, the HydraMat offers plenty of opportunities to take advantage of its obvious attributes. You can’t make horsepower without fuel and this simple device just might keep the fuel pressure constant, and that will help make horsepower. **CHP**





**10** | The whole idea for the HydraMat is to place a simple, all-inclusive fuel pickup for EFI-converted cars that is more than capable of maintaining fuel pressure during aggressive maneuvers, like those made on an autocross course, even with a low fuel level.



**11** | If the pump can only be mounted outside the tank, its best location is at or below the fuel level to minimize inlet restrictions. Larger lines leading to the pump will also improve pump efficiency. In this application, even with a HydraMat on the bottom of the tank, the pump still must pull fuel to the top of the tank, although siphoning effect will certainly help.



**12** | This cutaway shows how it would be easy to mount a HydraMat on the floor of a typical fuel cell using a -8 line to connect to the pump inlet. The weight of fuel in the foam could easily keep the HydraMat in place or Holley's mounts could be used.

## Parts List

Description	PN	Source
HydraMat 15x15 cross, 2.5 leg width	16-100	Summit Racing
HydraMat 15x8 cross, 2.5-inch leg width	16-101	Summit Racing
HydraMat 15x8 cross, 2.5-inch leg width	16-102	Summit Racing
HydraMat, 8x8 cross	16-103	Summit Racing
HydraMat, 11x11 cross	16-104	Summit Racing
HydraMat, 15x3 rectangle	16-105	Summit Racing
HydraMat, 11x11 square	16-106	Summit Racing
HydraMat, 15x15 square	16-107	Summit Racing
HydraMat, 8x3 rectangle	16-108	Summit Racing
Magnet kit, 4-40 connectors	16-203	Summit Racing
Magnet kit, 6-32 connectors	16-204	Summit Racing
Magnet kit, backing magnets for poly tank	16-205	Summit Racing
Mount kit, Click Bond for metal tanks	16-201	Summit Racing
Mount kit, Click Bond for poly tanks	16-202	Summit Racing
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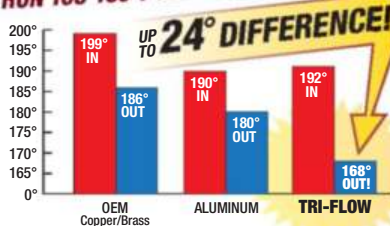


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CH12



# JUST SAYIN

BY: Kevin Tetz



## The Life Cycle of a Project Car

☒ Gearheads are a breed that is unreasonably driven to do what we do. We build cars to pay homage to what we covet, create something different than what we've seen, show it off, thump our chest, and move on to the next project. It's not a choice; more accurately it's a sickness, and I'm not the first to say that. Building cars is an emotional high – an adrenaline rush that has peaks and valleys, euphoria and disappointment, failure and inevitable success ... sometimes not. To my point in this rant, I want to talk about the pathology and the ridiculous psychological life cycle of any given project car and builder's journey. It's a journey with an arc of enthusiasm with several levels of rush, and a pendulum swing of emotion ranging from euphoria to terror. To illustrate my own experience, I've deconstructed the life cycle of a project build, outlining the stages of what I personally go through during the course of a restoration or rehab of a new four-wheeled mistress.

**Inspiration** – When imagination overrides reality and visions of an incredible resurrected vehicle pollute every waking moment.

**Justification** – (lies I tell myself) "I can do this without the credit card!" "I won't set any unrealistic goals." "I'll take my time and really enjoy the zen of this build." "It won't really take me away from home that much." I'm a pathological liar at this stage. I'll say anything to myself.

**Acquisition** – The thrill of the chase, searching forums, car shows, swap meets, and bird dogging rumors ... truly the stuff of which Jerry Heasley's legends are born. At this point I conveniently forget any budget I've ever set, or at least fudge the numbers to fit my plan.

**Build Plan** – Tons more optimistic research where the used parts markets abound with screaming deals, inexpensive donor cars, and stacks of parts I've got squirreled away that will be perfect for the new ride. Oh, and we gotta have a rendering!

**Teardown/inventory** – (reality starts to set in) Wow! There's a lot of rust repair and bodywork; this should have been a parts car. What the hell have I done.

**Restoration** – Several sub categories. Mostly rust repair and bodywork. Holy crap, this should have been "parts car." What the hell have I done (at least the glass is OK).

**-Mechanical**, (screwed, I need all new)

**-Electrical**, (screwed, I need all new)

**-Interior**, (screwed, I need all new)

**-Fine tuning**, (Connect the dots.

Dangit, forgot the driveshaft; connect the e-brake. (The glass is crap; I need all new)

**-Lift off!**, (Many high fives when it lights for the first time! When it engages in gear and moves on its own ... priceless!)

**Driving** – (I'll connect the e-brake later.) Unbelievable euphoria, followed by extreme paranoia; hyperfocus on every noise and vibration. Enjoying the righteous high-fives on the highway. "Nice car, Dude. My uncle had one just like that."

**Disillusion** – Six months pass and reality sets in. Wondering where the rush went. Acknowledging the long list of stuff still unfinished. (Gotta connect that e-brake cable.)

I am square in the middle of this curve with the ZedSled, my 1978 Z28. After hundreds of hours of bodywork it's finally under paint and ready for reassembly. The reality of bringing it to life for shakedown and driving the crap out of it is exciting and close! It's scary, intimidating, and redeeming on a deep psychological level. (Translated. I'm finally done spending money on it ... yeah, right). ZedSled will be bitchin, fun to drive, and it will be an ego-stroke to show it off, talk about it, bond with other

F-body nut-jobs that are equally obsessed with their cars, lose traction at every opportunity, and get many adrenaline rushes via the loud-pedal and steering wheel input. However, the puzzling truth is that even though I'm ramping up to the fun part of this build, I already see the final curtain – the light at the end of the tunnel – and it's a sad place to think about. The thoughts of "what's next?" Are creeping into my mind. What else have I always wanted to build? What else lights me up?

So here's the question I'm really trying to ask myself: What the hell is wrong with me? Why do I put myself through this over and over again? I sweat, get filthy, say bad words, make up more really bad words, and despite my best efforts, I always seem to wear a hole in the left knee of my jeans by the second week of a new project. What's to love about that? And when will I ever be satisfied with a car? As cliché as it sounds, the reward truly is in the journey. Redemption is in the accomplishment, the exercise in integrity, skill, and decision making, and it's the information we gather that makes us (hopefully) smarter, and more importantly, it's all about the friends we make along the way. Blah, blah, blah.

So screw it. Outa my way. I'm gonna finish this stupid Camaro 'cause I wanna drive! Point me to a car show with an autocross. Maybe there's a swap meet with a car corral that holds my new destiny.

Hello, my name is Kevin and I'm a caraholic.

Drop me a line at:  
chevyhi@enthusiastnetwork.com

Kevin Tetz is an automotive restoration expert, TV personality, freelance automotive journalist, and owner of Paintucation Instructional DVDs.

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